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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|-------------|----------------------|---------------------|------------------|
| 09/652,713 | 08/31/2000 | Trung T. Doan | 303.928US5 | 4284 |
| 21186 7590 08/19/2008 SCHWEGMAN, LUNDBERG & WOESSNER, P.A. P.O. BOX 2938 MINNEAPOLIS, MN 55402 | | | | |
| EXAMINER | | | | |
| MACARTHUR, SYLVIA | | | | |
| ART UNIT | | PAPER NUMBER | | |
| 1792 | | | | |
| MAIL DATE | | DELIVERY MODE | | |
| 08/19/2008 | | PAPER | | |

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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte TRUNG T. DOAN

Appeal 2008-3498
Application 09/652,713
Technology Center 1700

Decided: August 19, 2008

Before TERRY J. OWENS, JEFFREY T. SMITH, and
MICHAEL P. COLAIANNI, *Administrative Patent Judges*.

OWENS, *Administrative Patent Judge*.

DECISION ON APPEAL

The Appellant appeals from a rejection of claims 36-45, which are all of the pending claims.

THE INVENTION

The Appellant claims a device which, the Appellant states, is a chemical dispensing system for removing the edge bead formed during

semiconductor wafer spin coating processes (Spec. 1-4). Claim 36 is illustrative:

36. A device comprising:

a dispenser configured to release a chemical toward an edge bead of a substrate; and

a splash controller concentrically positioned at least partially around said dispenser and physically unattached from the edge bead, the splash controller being configured to draw the chemical from at least one surface of the substrate and toward said splash controller, wherein said splash controller is configured to generate a gas pressure around the edge bead that is lower than an ambient gas pressure, and wherein said splash controller is configured to physically intercept the chemical.

THE REFERENCES

| | | |
|---|--------------|---------------|
| Miyasono (Sukenari) ¹ (as translated) | JP 08-017708 | Jan. 19, 1996 |
| Tzeng | US 5,756,155 | May 26, 1998 |

THE REJECTIONS

The claims stand rejected as follows: claims 36-39 and 41-45 under 35 U.S.C. § 102(e) over Tzeng or Sukenari,² and claim 40 under 35 U.S.C. § 103 over Tzeng or Sukenari.

OPINION

¹ The Examiner and the Appellant refer to Miyasono as “Sukenari”. For consistency, we likewise do so.

² The Examiner’s rejection of claims 36-39 and 41-45 under § 102(e) over Sukenari is legally improper. Sukenari does not qualify as prior art under § 102(e) because it is a Japanese patent publication, not a US patent, a US patent publication, or a published PCT application, which satisfies the requirements of 35 U.S.C. § 102(e). Sukenari, however, qualifies as prior art under 35 U.S.C. §§ 102(a) and 102(b).

We reverse the Examiner's rejections. Regarding the rejections under 35 U.S.C. § 102(e) we need to address only the independent claims, i.e., claims 36 and 41. Claim 36 requires a "splash controller being configured to draw the chemical from at least one surface of the substrate and toward said splash controller, wherein said splash controller is configured to generate a gas pressure around the edge bead that is lower than an ambient gas pressure". Claim 41 requires "a splash controller including a vacuum port . . . wherein the vacuum port is configured to generate a gas pressure around the edge bead and the dispenser, the generated gas pressure being sufficiently lower than ambient gas pressure to draw the chemical from at least one surface of the substrate and toward the splash controller".

Rejection over Tzeng

Tzeng discloses "a nozzle that has a vacuum hood which delivers a vacuum to remove residue from the nozzle and exterior of the nozzle" (col. 1, ll. 8-10), and "a method for dispensing fluid from a nozzle without dripping fluid from the nozzle" (col. 2, ll. 33-35). The vacuum hood (18) has "an opening **17** surrounding the nozzle opening **16**" (col. 3, ll. 29-30). "The vacuum pressure near the nozzle is preferably in the range of between about 1 and 60 cm hg" (col. 4, ll. 27-29).³ "The invention removes residue from the tip of a nozzle thus preventing the residue from interfering with the spraying action or dripping down" (col. 3, ll. 24-27). Tzeng discloses (col. 6, ll. 31-47):

The vacuum is preferably turned on only when the nozzle is not dispersing fluid as shown in FIG. 7. This is coordinated with the movements of the nozzle as described above and shown in FIG. 6. When the nozzle is position[ed] immediately beside (position **1C**) the

³ The Appellant does not disclose the strength of the Appellant's vacuum.

wafer, the vacuum is turned off and the spray rinse is turned on. After the rinse is complete, the spray is turned off and the vacuum is turned on before the nozzle begins to rise. This ensures that any residue on the nozzle is removed before the tip is raised. The nozzle is then returned to its starting position 1A.

A common problem is where spray media drops or forms in a nozzle opening while the nozzle is waiting for the next wafer spray operation. By keeping the vacuum on during this rest period, any residue which forms is removed before the nozzle moves. Without the vacuum hood the media residue 3 would be thrown/dripped on the wafer as shown in FIG. 6 (position 1D) thus creating the patches.

In position 1D (Fig. 6) the distance between the nozzle and the wafer is between 1 and 3 cm, more preferably about 2 cm (col. 6, ll. 30-33). “The vacuum hood can extend out past the discharge opening of the nozzle tip to achieve additional vacuum pull” (col. 5, ll. 12-14).⁴

The Appellant argues that Tzeng’s “structure, while providing the function of droplet removal from a nozzle, simply fails to provide a suctioning functionality that extends substantially to an edge of an in-process wafer” (Reply Br. 2).

We interpret the Appellant’s argument as an argument that Tzeng’s vacuum hood is spaced far enough from the wafer that the vacuum is not strong enough to draw the spray media from the wafer surface.

The Examiner argues that Tzeng discloses the structure recited in the Appellant’s claims, and that the Appellant’s argument is unpersuasive as being directed toward an intended use of that structure (Ans. 7).

The requirements in the Appellant’s claim 36 that the splash controller is “configured to draw the chemical from at least one surface of the substrate

⁴ The Appellant does not disclose the distance between the Appellant’s splash controller and the substrate.

and toward said splash controller” and that the splash controller “is configured to generate a gas pressure around the edge bead that is lower than an ambient gas pressure” are structural requirements of the splash controller, not mere intended use. At the distance of the splash controller from the substrate, the splash controller must be structurally capable of generating a gas pressure around the edge bead (not merely around the dispenser tip) that is lower than an ambient gas pressure. The Examiner has not provided evidence or technical reasoning which shows that Tzeng’s structure meets those structural capability requirements. Likewise, the Examiner has not established that Tseng’s structure meets the structural capability requirement in claim 41 that the splash controller’s vacuum port “is configured to generate a gas pressure around the edge bead and the dispenser, the generated gas pressure being sufficiently lower than an ambient gas pressure to draw the chemical from at least one surface of the substrate and toward the splash controller”.

We therefore find that the Examiner has not established a prima facie case of anticipation of the Appellant’s claimed invention over Tzeng.

Rejection over Sukenari

Sukenari discloses “a resin film peeling method in which deep ultraviolet light focused on a resin film formed on a processing substrate is moved and irradiated continuously to selectively remove the area of said resin film irradiated by said deep ultraviolet light, characterized by the fact that at the same time said deep ultraviolet light is irradiated, an assisting gas is blown intermittently to an area irradiated by the deep ultraviolet light to intermittently change the atmosphere in that area” (¶ 0013). The deep ultraviolet light decomposes the resist into carbonic acid gas and water to be

removed (¶ 0014). Sukenari's deep ultraviolet light beam (DUV) is surrounded, above the resist film (3), by an assisting gas spray nozzle (14), and that nozzle is surrounded by a local exhaust nozzle (15) connected to an exhaust pipe (17) (¶ 0021; fig. 1).

The Examiner argues (Ans. 8):

Sukenari teaches a local ventilation nozzle 15, exhaust pipe arrangement 17, both splash controllers that are concentric and surround/are positioned about the dispensers 14, 16. Vacuum devices function on the premise that their pressure is lower than the ambient pressure and have the structural limitations to support these phenomena.

As pointed out above regarding the rejection over Tzeng, the capability of the Appellant's splash controller to draw chemical from the substrate surface, as required by the Appellant's independent claims, is a structural requirement of the splash controller. The Examiner has not established that Sukenari's local exhaust nozzle 15, which removes carbonic acid gas and water generated when the resist is decomposed by the deep ultraviolet light (¶ 0014), is capable of drawing a chemical from a substrate.

Hence, the Examiner has not established a prima facie case of anticipation of the Appellant's claimed invention over Sukenari.

Rejection under 35 U.S.C. § 103

The Examiner does not rely upon Tzeng or Sukenari for any disclosure that would have rendered prima facie obvious, to one of ordinary skill in the art, the above-discussed deficiency in each reference as to the independent claims (Ans. 6-9).

Accordingly, we conclude that the Examiner has not established a prima facie case of obviousness of the invention claimed in the Appellant's claim 40 over Tzeng or Sukenari.

DECISION

The rejections of claims 36-39 and 41-45 under 35 U.S.C. § 102(e) over Tzeng or Sukenari, and claim 40 under 35 U.S.C. § 103 over Tzeng or Sukenari are reversed.

REVERSED

tf/lr

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